



Figure 1. Greater Widnes area with study site in lower right hand corner (© Halton Borough Council 2007).

Using the ecosystem service framework to select grazing or mowing as a preferred vegetation management option

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Introduction

- Conservation grazing by cattle or mowing were alternatives proposed by Halton Borough Council, Cheshire to maximise the delivery of ecosystem services at Widnes Warth, a truncated upper saltmarsh in the Upper Mersey Estuary, grid reference SJ 527 850 (Figure 1). The research site, 5ha in size, comprises large areas of homogeneous vegetation typical of previously grazed saltmarsh having been ungrazed for at least 10 years.
- Ecosystem services are those benefits provided by nature to human society. The current benchmark for the characterisation and typology of these comes from the Millennium Ecosystem Assessment (MA, 2005) and is used in the current study.
- Grazing of saltmarsh has been shown to increase diversity of plants and create suitable breeding habitat for waders in particular (Doody, 2008). Mowing and grazing are recommended as options in saltmarsh restoration de-embankment programmes to maintain plant diversity (Wolters *et al.*, 2005).
- Conservation grazing and mowing will either increase, decrease, or have no influence on the delivery of a suite of ecosystem services from the saltmarsh.
- As part of a wider effort to maximise ecosystem services delivered by the Upper Mersey Estuary through vegetation management, the aim of the current study is to use a rapid assessment to indicate the effect of each method on a recognised set of ecosystem services attributable to saltmarsh. These predictions will be tested through empirical research in 2011-13.

Methods

- The effects (an increase, decrease or no change) of each management method on the selected ecosystem services was determined through a systematic literature review using Google Scholar™, ScienceDirect®, Scopus®, and text books relating to saltmarsh.
- The rapid assessment used a set of arrows as a visual tool to indicate the effect of each method, from the literature review, on the selected ecosystem services.
- The direction of the arrows was determined in a two stage process. First; against the *status quo* and second, by comparing with each other to decide the magnitude of the change (moderate or marked).



Figure 2: English Longhorn cattle on Widnes Warth. Photo D.J.Smith 2011.

Results

- The arrows show higher delivery of ecosystem services for conservation grazing. Differences between the two options were few, five ecosystem services revealed differences in the magnitude of change: primary production, provision of habitat, food production, aesthetic, and recreation (Table 1). The clearest difference was in cultural services.

Table 1: Rapid assessment of the influence of conservation grazing or mowing on saltmarsh ecosystem services (typology adapted from the MA, 2005).

Category , example of Service	Conservation grazing	Mowing (bi-annually)
Supporting		
Primary Production	↑	↗
Provision of habitat for wildlife	↑	↗
Nutrient cycling	↗	↗
Provisioning		
Food production	↑	→
Wood and fibre	→	→
Regulating		
Flood regulation	→	→
Water purification	→	→
Carbon sequestration	→	→
Cultural		
Aesthetic	↑	↘
Educational / research	↑	↑
Recreation	↑	↗

Arrows indicate a marked increase ↑, medium increase↗, no change→, medium decrease↘ or a marked decrease↓ by each option on ecosystem services. References available in conference proceedings.

Discussion

- The rapid assessment indicated that there were few differences between the two options in this habitat. However, where there were differences (five criteria in Table 1) they all indicated that conservation grazing would lead to more positive changes in ecosystem services delivered by this saltmarsh than if mowing alone was used.
- The urban location of the saltmarsh in Widnes contributed to the importance of the cultural services, published sources relating to this ecosystem service category were characterised by a distinct paucity of data. The presence of cattle (Figure 2) increases the aesthetic and recreational differences found than by mowing.
- English Longhorn cattle were introduced to the saltmarsh on the 13 April 2011 (Figure 2). The effects of grazing on vegetation community and structure are being assessed using exclosures to inform the provision of habitat for wildlife. For cultural services, use of the saltmarsh by amenity users is being monitored by observation to draw conclusions of visitor patterns.

References

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